



**Fraunhofer**

**TESTED<sup>®</sup>  
DEVICE**

Hanshin Chain Co., Ltd.

HSP 0450-1BN

**Report No. HA 1304-643**

DUPLICATE

Statement of  
Qualification

# Statement of Qualification

**Customer:** Hanshin Chain Co., Ltd.  
2 BA 401-3, Shiwha Industrial Complex  
429-926 Gyunggi-do  
Korea

**Test results / Classification:**  
(according to ISO 14644-1)

The RoboChain HSP 0450-1BN is suitable for use in cleanrooms fulfilling Air Cleanliness Class 2.

## Component tested:

Category: Energy Supply  
Subcategory: Cable Guiding Systems  
Type: RoboChain HSP 0450-1BN

## Random check measurements of particle emission (airborne) at representative points

Test procedure: According to VDI 2083-9.1; ISO 14644-1  
Each standard states refers to the version valid at the time of testing.

Measuring instruments: Optical Particle Counter:  
LasAir II 110 with measuring channels of  $\geq 0.1 \mu\text{m}$ ,  $\geq 0.2 \mu\text{m}$ ,  $\geq 0.3 \mu\text{m}$ ,  
 $\geq 0.5 \mu\text{m}$ ,  $\geq 1.0 \mu\text{m}$  and  $\geq 5.0 \mu\text{m}$

Test parameters of the test environment:

- Cleanroom Air Cleanliness Class (according to ISO 14644-1):..... ISO 1
- Air flow velocity:..... 0.45 m/s
- Air flow guidance: .....vertical unidirectional air flow
- Temperature: .....22 °C  $\pm$  0.5 °C (71.6 °F  $\pm$  0.9 °F)
- Relative humidity: ..... 45 %  $\pm$  5 %

Test parameters of the test execution:

- Number of chain links:..... 18
- Chain length (incl. brackets): ..... l=940 mm
- Bending radius of the chain: ..... r=95 mm
- Stroke length:..... s=820 mm
- Parameter set 1: .....  $v_1=0.5 \text{ m/s}$ ;  $a_1=1.0 \text{ m/s}^2$
- Parameter set 2: .....  $v_2=1.0 \text{ m/s}$ ;  $a_2=2.0 \text{ m/s}^2$
- Parameter set 3: .....  $v_3=2.0 \text{ m/s}$ ;  $a_3=4.0 \text{ m/s}^2$

DUPLICATE

DUPLICATE

The measuring equipment used for the qualification is regularly calibrated and is based on national and international standards. In the case where no national standards exist, the measuring procedure used corresponds with technical regulations and norms valid at the time of the measurement. The documents drawn up for this procedure are available for viewing.

The validity of this certificate applies only to the mentioned product in this particular condition for a duration of 5 years.  
Further information: [www.tested-device.com](http://www.tested-device.com).

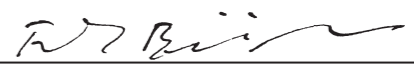
Fraunhofer Institute for  
Manufacturing Engineering and Automation IPA

Department Ultraclean Technology  
and Micromanufacturing

Nobelstrasse 12  
70569 Stuttgart  
Germany

Stuttgart, June 12, 2013

Place, Date

  
i. A.   
Project manager